Tree/Shrub Planting for: Reforestation, Windbreaks and Wildlife

CONSERVATION DESIGN SHEET - Forestry Series 612A

Natural Resources Conservation Service

Michigan

Proper site and seedling selection along with good weed control and planting technique make for successful reforestation. Containerized seedlings (as shown above) offer several advantages over bare-root stock.

Species and Soil-site Selection

Trees and shrubs grow best on sites with soils and climate similar to those in which they have become naturally adapted. Review county soil survey maps to determine soil type(s) in area to be planted. Consult section II of Michigan NRCS Field Office Technical Guide to determine suitability and potential productivity for various species on soil groupings for Forestry, Wildlife and Windbreak purposes.

Site Preparation

Site preparation is needed to reduce competition, assure tree survival and stabilize the planting area. This can be accomplished through either mechanical or herbicide treatment. (See Michigan NRCS Std. #490 – Forest Site Preparation and Michigan NRCS Job Sheet #612 – Weed Control for Tree/Shrub Establishment)

Mechanical Treatment: This will provide initial control of weed competition. Follow-up treatment with a herbicide or mulch is often needed after the first growing season to provide adequate control of competition.

- Light Cover of Vegetation: Existing vegetative cover: moss, open sand, light June Grass, etc. No ground preparation is necessary.
- Medium Cover of Vegetation: Existing vegetative cover: medium density June Grass, light Quack Grass and old fields. Remove the sod layer within a three-foot area around the tree site, or by shallow 2-4 inch deep furrowing with a plow or other tillage means prior to planting.
- Heavy Cover of Vegetation: Existing vegetative cover: dense June Grass, dense Quack Grass, good hay fields and Sweet Fern. Kill and/or remove the sod by scalping a three-foot area around the tree site by plowing or other tillage means in the fall before spring planting. Cultivate or mulch around trees during the growing season to control vegetation. Note: Care must be taken to prevent damage to tree/shrub stems during cultivation.

Herbicide Treatment - This will provide initial control of weed competition but repeated applications will be needed to provide adequate control of competing vegetation for two to three years after planting.

- Light Cover of Vegetation: Existing vegetative cover: moss, open sand, light June Grass, etc. No herbicide treatment is necessary.

- Spot or band treat an area a minimum of three feet around the tree site. Use only herbicides labeled for the species being planted and the intended use of the trees. (Refer to North Central Regional Extension Publication #251: "Effective Herbicide Use in Christmas Tree Plantations," North Central Extension Bulletin #2593: "Pesticides for Use in Conifer Nursery Production in the North Central Region" and North Central Extension Bulletin E-2592: "Pesticides for Use in Forest and Seed Tree Orchards in the North Central Region"

- The preferred timing for herbicide treatment is one season prior to the planting of the trees/shrubs. With spring planting there is a greater risk of damaging trees (also, fewer herbicides are species selective) if a herbicide is applied after planting.
- When dense vegetative cover is present, herbicide should be applied in late summer or early fall prior to spring planting. This practice normally will provide optimum weed control and better tree/shrub survival.
- Follow all label directions and contact Michigan State University Extension Offices or the Natural Resources Conservation Service for herbicide information.

Note: Cover crops or permanent sod strips may be needed between tree/shrub rows on sandy or highly erosive sites in order to prevent erosion and damage to seedlings by sandblasting.

Care of Seedlings

Proper care of seedlings prior to and during the planting process is critical to ensuring a successful planting. Seedlings that have had roots dried, frozen, or subjected to mold or high temperature should be assumed dead and not suitable for planting.

- Seedlings should be packed and shipped in wet moss or other medium, kept cool (between 33 and 37 degrees F) and moist through the planting process. Exposure to drying sun and wind can kill a seedling in less than 30 seconds.
- Plant seedlings as soon as possible after they are received, keeping roots moist throughout the planting process.
- Store seedlings in a cool, moist, shaded location up to 7 days. Do not stack bundles of trees in layers of more than two deep to allow adequate air circulation and prevent heating.
- If planting is delayed for longer than seven

days after receipt and they can not be kept in cold storage, heel the seedlings in a shaded area and keep them moist. To heel-in seedlings: Dig a trench in the soil, place the seedling in the trench and cover the roots with soil, wetting the soil and roots during the process. Refer to *Figure 3.*

- Avoid dipping or immersing roots in water as soil particles will be washed off. Mist seedlings to keep them moist.
- Water absorbent/retention dip may help conserve moisture on seedling roots when planting in dry weather.

Planting and Spacing Requirements

- Tree/shrub spacing and densities vary depending on the purpose of planting:

  1. Timber production:
     Conifers - 600-1000/ac.
     Hardwoods - 300-500/ac.
  2. Wildlife Plantings: 300-1200/ac
  3. Windbreak/Shelterbelt Plantings: Refer to Michigan NRCS Standard #380 Windbreak/Shelterbelt Establishment for spacing requirements on trees and/or shrubs. Refer to *Table 1. Common Tree/Shrub Spacings*
  4. Christmas Trees: 1200/ac.

- Trees may be planted with a tree planting machine or by hand using a planting bar, shovel, or other tool. Refer to *figures 1 and 2*. Plant trees in the middle of the prepared site or area to ensure maximum distance from competing vegetation.
- Plant trees/shrubs in a vertical position with the root collars approximately one inch below the soil surface to ensure adequate coverage of the roots with soil. Roots may be pruned to eight inches (on 2-0 seedlings only) in length from the root collar to facilitate proper planting. Refer to *Figure 1.*
- The trench or hole should be deep and wide enough to permit the roots to be spread out in a natural, uncurled position. Avoid "J" rooting. Refer to *Figure 2 and drawings 1, 2, and 3 of Figure 4.*
- Soil around the seedling should be packed firmly to eliminate all air pockets.
- Planting should be done in the spring as soon as possible after the frost is out of the ground. Fall planting is acceptable on light soils (sands, loamy sands, or sandy loams) after seedling buds are dormant and until frost or snow interferes.
- Tiny seedlings may be planted in a nursery bed for close care and to increase in size until transplanted. Plant seedlings 6-12 inches apart, control weeds and provide water as needed. Transplant seedlings to permanent location after 2-3 years in the nursery bed. When transplanting, dig as much root area as possible for each seedling and leave the soil attached to the roots.

Table 1 - Common Tree/Shrub Spacings

Spacing (feet)	Plants/Acre
6 x 6	1210
6 x 8	907
6 x 10	726
7 x 7	889
7 x 10	622
8 x 8	681
8 x 10	544
8 x 12	453
9 x 9	538
12 x 10	436
12 x 12	302

Maintenance

- Check survival the first and second year and replant where survival is poor. Supplemental watering may be needed to increase survival during droughty periods.
- Control competing vegetation where needed during the first three years by mulching, use of fabric weed barriers, and/or herbicide treatment. Note: Mowing and tillage are not recommended weed control practices in field plantings.
- Exclude livestock from all plantings and monitor to protect from insect, disease and animal pests by use of shelters, wire, guards, repellents, pesticides or fencing as needed.
- Protect large plantings from fire by establishing firebreaks. Refer to Michigan NRCS Standard #394 - Firebreak.

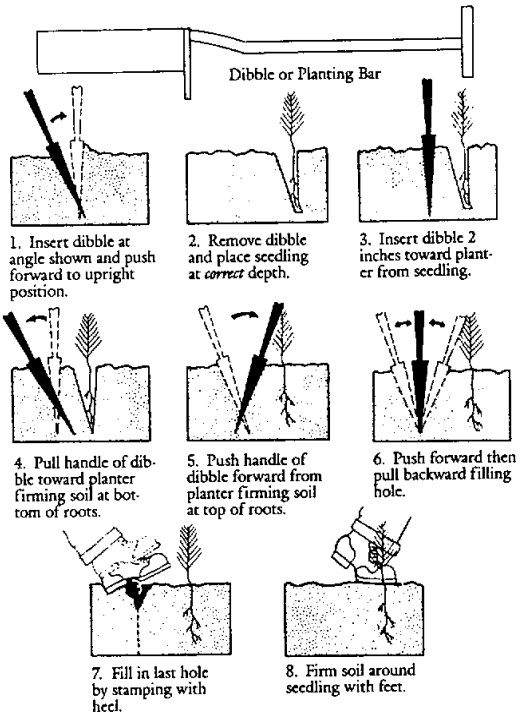


Figure 1: Using a dibble (planting bar) to plant seedlings.

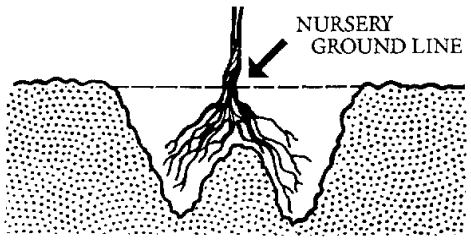


Figure 2: An example of the hole and shovel method of planting seedlings.

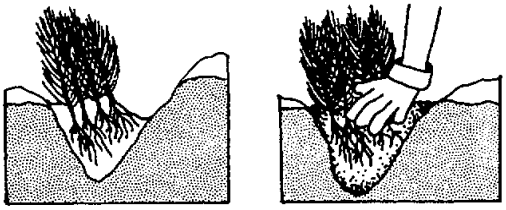


Fig. 3. **One method of long-term tree storage is the "heeling-in" technique. Roots must be packed tightly in soil and kept moist, and the heel-in trench must be shaded and protected from the wind.**

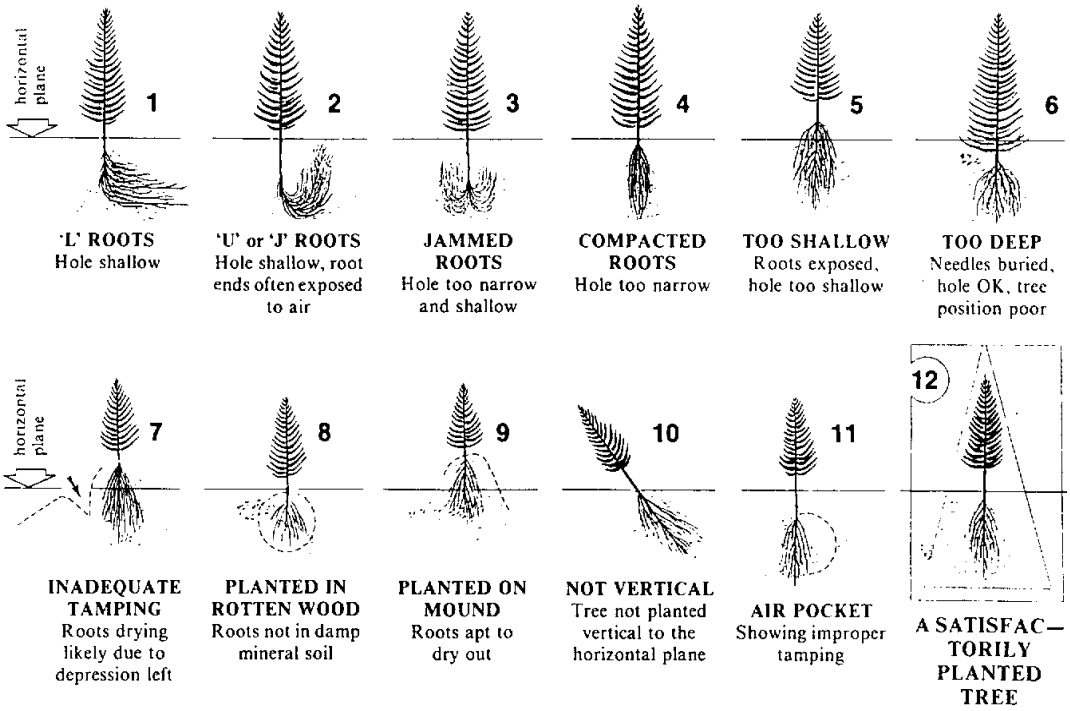


Figure 4. **Drawings 1 through 11 illustrate various ways that trees should not be planted. The ideal planting is shown in drawing 12.**

Tree/Shrub Planting Plan

Land User_____ Date_____

Address_____Phone #_____

County_____Purpose(s) of Planting_____
(windbreak, wildlife, or forest suitability)

Date of Planting_____Soil Type_____Group_____

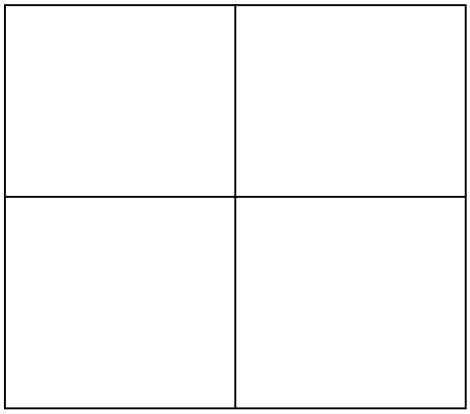
Planting Method_____ Site Preparation_____

Map Scale: _____ Location: Twp._____Range_____ Sec._____

_____

N

Map Scale:_____



Sketch of Planting Layout

Row	Species	Spacing in Rows	Spacing Between Rows	Row Length	Acres of Planting	Number of Trees Needed

Maintenance_____
_____
_____

Landowner Signature_____ Field Representative Signature_____

Date_____ Date_____

The following references may be useful to those seeking additional information on this subject:

Tree Planting in Michigan, June, 1997, D.O. Lantagne and M.R. Koelling, Michigan State University Extension Bulletin, E-771, East Lansing, MI, Hardwood Planting on Abandoned Farmland in Southern Ontario, F.W. von Althen, 1990, Forestry Canada, Ontario Region, Sault Ste. Marie, Ontario, Tree City USA Bulletin No. 19, How to Select and Plant a Tree, National Arbor Day Foundation, 1993, Nebraska City, NE, Growing Christmas Trees in Michigan, Michigan State University Extension Bulletin E-1172, April, 1982, M.R. Koelling and D.P. White, East Lansing, MI, Recommended Species for Christmas Tree Plantings in the North Central United States, North Central Regional Extension Bulletin No. 479, November, 1993, M.R. Koelling and R.B. Heiligmann, Michigan State University, East Lansing, MI, Michigan Field Office Technical Guide, Sec.II, Forestry, Wildlife and Windbreak Interpretations, USDA-NRCS, East Lansing, MI, Seeding and Planting in the Practice of Forestry, J.Toumey and C.F. Korstian, Second Edition, John Wiley and Sons, NY. Forestry Handbook, Karl Wenger, 1984, John Wiley and Sons, NY. The Practice of Silviculture, D.M. Smith, Seventh Edition, John Wiley and Sons, NY.

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